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Title : MODELLING PREY CHOICE BY GREY SEALS: THE MULTI-SPECIES FUNCTIONAL RESPONSE

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Abstract : Most seals are generalist predators whose diet includes commercially-important fish species. For centuries fishers have regarded seals as competitors and have been concerned about the quantities of fish they consume. Recently they have also been concerned about the impact of seals on the dynamics of fish stocks. In principle, generalist predators are able to drive some prey species to extinction or trap them in a low abundance "predator pit". The likelihood of these events depends on the seals' functional response: the way in which they respond to changes in prey abundance.

We used Bayesian statistical methods to fit a generalised multi-species equation, which is capable of describing all of the standard types of functional response, to data on the diet and prey availability of grey seals (Halichoerus grypus) from a number of haul-outs on the coast of Scotland. The availability of each of 131 prey species/size classes was estimated using information from research vessel surveys and telemetry data on the use that seals made of the sea area around each site. The consumption of each prey class was determined using scat analysis and estimates of the seals' daily energy requirement. Prey were then grouped into categories, using cluster analysis. The resulting posterior distributions were used to predict how seal-induced mortality might vary with prey abundance, and to evaluate the uncertainty associated with these predictions.